Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

Version 2.0

Issue date: 06/12/2024

Effective date: 06/02/2025

Health Policies and Standards Department

Health Regulation Sector (2024)

ACKNOWLEDGMENT

The Health Policy and Standards Department (HPSD) developed this Standard in collaboration with the Donation and Transplantation Institute (DTI Foundation), The National Center for Organ Donation and Transplant (MOHAP) and Subject Matter Experts. We would like to acknowledge and thank these stakeholders for their dedication toward improving the quality and safety of healthcare services in the Emirate of Dubai.

Health Regulation Sector

Dubai Health Authority

TABLE OF CONTENTS

ACKNOWLEDGMENT 2

INTRODUCTION 5

EXECUTIVE SUMMARY 6

KEY UPDATES 6

ABBREVIATIONS 7

DEFINITIONS 8

1. **BACKGROUND** 13
2. **SCOPE** 14
3. **PURPOSE** 14
4. **APPLICABILITY** 14
5. **STANDARD ONE:** HEALTH FACILITY REQUIREMENTS FOR DONOR HOSPITAL 14
6. **STANDARD TWO:** HEALTH FACILITY REQUIREMENTS FOR DBD RETRIEVAL CENTER 16
7. **STANDARD THREE:** HEALTHCARE PROFESSIONALS REQUIREMENTS 17
8. **STANDARD FOUR:** REPORTING POSSIBLE AND POTENTIAL DNC DONORS 19
9. **STANDARD FIVE:** ASSESSMENT OF DEATH BY NEUROLOGICAL CRITERIA (DNC) 22
10. **STANDARD SIX:** DNC DECLARATION AND ISSUANCE OF DEATH CERTIFICATE 26
11. **STANDARD SEVEN:** POTENTIAL DONOR MANAGEMENT 28
12. **STANDARD EIGHT:** FAMILY COMMUNICATION 29
13. **STANDARD NINE:** DBD ORGAN AND TISSUE RETRIEVAL 31
14. **STANDARD TEN:** ORGAN AND TISSUE DONATION REGISTRY AND KEY PERFORMANCE INDICATORS – DONATION AFTER BRAIN DEATH (DBD) 34

REFERENCES 42

APPENDIX 1: POTENTIAL DECEASED BRAIN DEATH (DBD) DONORS REFERRAL FORM 44

APPENDIX 2: DEATHS WITH ACUTE CEREBRAL LESION ICD- 10 CODES..... 45

APPENDIX 3: UAE ORGAN AND TISSUE DONATION PROCESS MANAGEMENT PROTOCOL: STANDARDIZED PROCEDURES FOR REPORTING CRITICAL CASES AND REFERRING POTENTIAL DONORS..... 46

APPENDIX 4: BRAIN FUNCTIONS ASSESSMENTS FORM OF DEATH BY NEUROLOGICAL CRITERIA..... 47

APPENDIX 5: LIST OF COMMONLY USED DRUGS AND A FIVEFOLD HALF-LIFE THAT CAN BE CONSIDERED WHEN MAKING A DECISION ABOUT DEATH BY NEUROLOGICAL CRITERIA..... 54

APPENDIX 6: UNIFIED CONSENT FORM..... 55

APPENDIX 7: UAE FORM FOR WITHDRAWAL OF ORGAN VIABILITY MAINTENANCE EQUIPMENT..... 57

UAE FORM FOR WITHDRAWAL OF ORGAN VIABILITY MAINTENANCE EQUIPMENT..... 57

APPENDIX 8: APNEA DURING ECMO TREATMENT..... 58

INTRODUCTION

The Health Regulation Sector (HRS) plays a key role in regulating the health sector. HRS is mandated by the Dubai Health Authority (DHA) Law No. (6) of the year (2018) with its amendments pertaining to DHA, to undertake several functions including but not limited to:

- Developing regulation, policy, standards, guidelines to improve quality and patient safety and promote the growth and development of the health sector;
- Licensure and inspection of health facilities as well as healthcare professionals and ensuring compliance to best practice;
- Managing patient complaints and assuring patient and physician rights are upheld;
- Governing the use of narcotics, controlled and semi-controlled medications;
- Strengthening health tourism and assuring ongoing growth; and
- Assuring management of health informatics, e-health and promoting innovation.

The Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD) aims to fulfil the following overarching Dubai Health Sector Strategy 2026:

- Pioneering Human-centered health system to promote trust, safety, quality and care for patients and their families.
- Make Dubai a model for accessible value-based health care.
- Make Dubai a lighthouse for healthcare governance, integration and regulation.

EXECUTIVE SUMMARY

Human Organ & Tissue Donation Services is considered one of the major and vital implementations in the world of health. These standards support saving lives through organ donation by identifying Death by Neurological Criteria who are potential organ donor candidates. These guidelines describe a clear and comprehensive process for evaluating patients with permanent cessation of all brain functions due to structural and irreversible brain damage that characterizes the diagnosis of death by neurological criteria (DNC Diagnosis). These standards are developed in line with applicable laws and legislations that are already in place:

- Federal Decree-Law No. (25) of 2023 regarding Donation and Transplantation of Human Organs and Tissues,
- Ministerial Decree No. (19) for the year 2022 related to Death Diagnosis Criteria,
- UAE Federal Decree Law No. (4) of 2016 on Medical Liability.

KEY UPDATES

- Standard two: Health Facility requirements for DBD Retrieval Center
- Standard seven: Potential donor management
- Standard eight: Family communication
- Standard nine: DBD organ and tissue retrieval
- Standard ten: Organ and tissue donation registry and key performance indicators – Donation after Brain Death
- Appendix 3: UQE Organ and tissue donation process management protocol
- Appendix 8: Apnea during ECMO treatment

ABBREVIATIONS

CCSU : Critical Care Support Unit.

CCSUC: Critical Care Support Unit Coordinator.

DBD : Donation after Brain Death.

DHA : Dubai Health Authority.

DNC : Death by Neurological Criteria.

EEG : Electroencephalogram.

GCS : Glasgow Coma Scale.

ICU : Intensive Care Unit.

MRP : Most Responsible Physician.

MD : Medical Director.

NCDT : National Center for Donation and Transplantation

OPO : Organ Procurement Organization

ORT : Organ Retrieval Team

DEFINITIONS

Cerebral Lesion: any structural brain injury caused alone or in association with other complicating factors, which may cause death by neurological criteria in a hospital (ICU, ER, etc.). This also includes:

- Acute cerebral lesion (brain trauma, anoxia, cerebral bleeding, stroke, etc.) that supervenes as a complication.
- Subacute or chronic disorders such as brain tumors when acute transformation occurs, such as spontaneous or postoperative intracranial hypertension, hemorrhage, or cerebral oedema occurs.

Clinical Privileging: process of granting a DHA licensed healthcare professional permission to carry out specific duties as per health facility scope of practice and licensure. This involves the review of credentials and qualifications, training, competence, practical independence and experience, aligning to the needs of the Clinical Privileging Committee (CPC) which is the responsible entity to authorize or deny clinical privileges.

Comatose Patients: patient with Glasgow Coma Scale (GCS) of < 8 upon admission to the health facilities or during ICU management not caused by sedation.

Consent For Donation: legally valid from the potential donor's next of kin for the retrieval of donor organs and tissues for the purpose of transplantation using the unified consent form, which may be executed through written or verbal communication

Critical Care Support Unit (CCSU): 24/7 operating unit within the health facility's ICU responsible for all organ and tissue donation matters, run by the critical care support unit director and coordinator/s. Formerly known as the *Organ Donation Unit (ODU).*

Critical Care Support Unit Director (CCSUD): an ICU intensivist that leads the CCSU, including all standard operation procedures required for the unit, to supervise the critical care support unit team and coordinators and oversees implementation of all steps of the organ and tissue donation process. This position was previously known as the *Organ Donation Unit Director.*

Critical Care Support Unit Coordinator (CCSUC): Critical Care Nurse, Intensivist or other trained clinical staff assigned by the health facility management, responsible for ensuring that all organ and tissue donation process steps occur as per hospital protocol and all communications between the CCSU, DHA and the National Center for Donation and Transplant (NCDT) are performed in a timely manner to facilitate organ and tissue donation and transplantation process. This role was previously known as the *Organ Donation Unit Coordinator (ODUC).*

Death by Neurological Criteria (DNC): death by neurological criteria, commonly called brain death, is defined as the permanent cessation of encephalic activities (cerebral hemispheres and brain stem) resulting from catastrophic brain injury, with medical documentation of known brain injury and in the absence of pharmaceutical sedation.

Death Determination: is defined by complete and terminal cessation of heart, and breath (cardiopulmonary system) or permanent termination of all brain functions, and by three or more physicians in agreement that this determination is definitive in accordance with criteria

mentioned at the document and the Ministerial Resolution No.19, Concerning the Criteria for the Diagnosis of Death.

Donation by Neurological Criteria (DNC) Donor: human being declared, dead by DNC and from whom organs, tissues or cells may be retrieved for the purpose of transplantation.

Donation after Brain Death (DBD): deceased donor declared dead by neurological criteria.

Neurological Advice: process by which an external competent entity shall oversee and support a health facility to meet the requirements of brain function assessment. The nominated hospital performing neurological adviser shall have sufficient and competent privileged healthcare professionals who are licensed by DHA or another health regulator in the UAE

Human Organ and Tissue Services: organ and tissue donation and transplantation are services of retrieving an organ from one person (the donor) and surgically for the purpose of placing it into another (the recipient) who is in end stage organ, or tissue, failure.

Medical Director: DHA licensed healthcare professional who holds responsibility and oversight of medical services within a DHA licensed health facility.

Most Responsible Physician (MRP): qualified physician who has a primary responsibility for the care of patient in the health facility.

National Center for Donation and Transplantation (NCDT): federal center under the Ministry of Health and Prevention responsible to regulate and coordinate organ and tissue donation and transplantation in the UAE.

Next of Kin: a person authorized to make decisions on behalf of the patient, in cases where the patient is incompetent, or the relatives up to the fourth degree available in the country or by telephone or computer visual and audio/sign language communication, based on the below order:

A. The father.

B. The mother.

C. The offsprings (adult).

D. The spouse.

E. The grandfather.

F. The siblings.

G. The paternal uncle and the full uncle is precedent to the half uncle.

Organ Retrieval Team (ORT): specialized group responsible for carrying out the surgical retrieval of organs from deceased donors. ORT ensures that organs are procured in alignment with medical protocols and legal standards.

Organ Procurement Organization (OPO): entity that coordinates the process of organ donation and transplantation. It is responsible for identifying potential donors, obtaining consent, and managing the logistics of organ retrieval.

Possible Death by Neurological Criteria (DNC) Donor: an individual of any age with Glasgow Coma Scale of ≤ 8 before the start of sedation or not sedated after starting mechanical ventilation; experienced a cerebral lesion with devastating brain lesion (post-resuscitation, cerebral anoxia, Cerebrovascular Accident (CVA), cerebral hemorrhage, encephalopathy, traumatic brain injury), and with intact cardiac circulation.

Potential Death by Neurological Criteria (DNC) Donor: an individual of any age with Glasgow Coma Scale of ≤ 5 before the start of sedation or not sedated, on mechanical ventilation and experienced a cerebral lesion with devastating brain lesion (anoxic encephalopathy, cerebral hemorrhage, stroke, traumatic brain injury, encephalitis and meningoencephalitis, central nervous system tumors), and with intact cardiac circulation.

1. BACKGROUND

Organ donation not only saves lives but also creates opportunities to improve the quality of life for patients suffering from end stage organ failure.

Deceased individuals are assessed based on their age, their medical records, and the fulfilment of the medical criteria for donation dictated by the organ donation and transplantation authorities, as candidates for organ transplantation.

The criteria for the determination of death are based on a set of first-release consensus recommendations for the assessment and diagnosis of death, as per the international panel of worldwide experts. It is defined as complete and terminal cessation of heart, and breath or irreversible termination of all brain functions. The aim of Ministerial Resolution No.19, Concerning the Criteria for the Diagnosis of Death is to standardize the diagnosis of death by neurological criteria and death by circulatory criteria on a national level and support healthcare professionals in this field.

Currently, the demand for organs and tissues for transplant is much higher than the available supply. Statistics show that Spain (Spanish Model) has the highest percentage of donors after death for every million globally in 2023, followed by the USA (USA Model), and the European countries (European Model). Although organ donation activity in the UAE has increased significantly in the last 3 years, the implementation and consolidation of best practices in organ and tissue donation suggested by these standards will contribute to this curve continuing to rise and more lives being saved.

2. SCOPE

2.1. Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD) in DHA licensed health facility with ICU services

3. PURPOSE

3.1. To assure provision of the highest levels of safety and quality of Human Organs and Tissues Donation Services (for all Deceased Donors) – Donation after Brain Death (DBD) in Dubai Health Authority (DHA) licensed health facilities.

3.2. To ensure the diagnosis of Death by Neurological Criteria (DNC) is consistently aligned with international best practices and UAE law.

3.3. To ensure the improvement of the diagnosis and reporting of DNC; to support organ donation and transplantation on the national level.

4. APPLICABILITY

4.1. DHA licensed health facilities with Intensive Care Units (ICU) under the jurisdiction of Dubai Health Authority (DHA).

5. **STANDARD ONE:** HEALTH FACILITY REQUIREMENTS FOR DONOR HOSPITAL

5.1. The health facility shall meet requirement as per the DHA Health Facility Guidelines (HFG) 2019, Part B – Health Facility Briefing & Design - Intensive Care Unit.

5.2. The health facility providing ICU services shall have the following policies and procedures in place, to cover all relevant donation steps which include but not limited:

5.2.1. Potential donor identification and referral information -**Appendix 1**;

5.2.2. Potential donor evaluation;

5.2.3. Potential donor management;

5.2.4. Death Determination by Neurological Criteria;

5.2.5. Breaking bad news;

5.2.6. Operating theatre procedures;

5.2.7. Communication between ICU professionals, Critical Care Support Unit (CCSU), and the National Center for Donation and Transplant (NCDT);

5.3. The health facility providing ICU services shall have CCSU.

5.4. The health facility shall ensure it has in place an active morbidity and mortality committee supported by written terms of reference.

5.4.1. The morbidity and mortality committee shall maintain a register of the healthcare professional names involved in DNC assessment and diagnosis.

5.4.2. The health facility's morbidity and mortality committee shall review the cases of DNC determined and provide recommendations for assessment and management whenever required.

5.4.3. The health facility shall report the ICU mortality rate to DHA on a regular basis, refer to standard ten.

5.4.4. The health facility's morbidity and mortality committee shall review the death cases with a primary diagnosis of acute cerebral lesion, and not DNC diagnosis, as per **Appendix 2**, and to provide recommendations for DNC diagnosis optimization as per the approved standards.

6. **STANDARD TWO:** HEALTH FACILITY REQUIREMENTS FOR DBD RETRIEVAL CENTER

6.1. The health facility shall meet requirements as per the DHA Health Facility Guidelines (HFG) 2019, Part B – Health Facility Briefing and Design - Intensive Care Unit.

6.2. The health facility providing ICU services shall develop the following policies and procedures in place, to cover all relevant donation steps which include but not limited:

6.2.1. Potential donor identification and referral information -**Appendix 1**.

6.2.2. Potential donor evaluation.

6.2.3. Potential donor maintenance.

6.2.4. Death Determination by Neurological Criteria.

6.2.5. Breaking bad news.

6.2.6. Communication between ICU professionals, critical care support unit, and the NCDT.

6.2.7. Organ and tissue retrieval; and

6.2.8. Organ packaging and transportation.

6.3. The health facility providing ICU services shall have a CCSU.

6.4. The health facility shall ensure it has in place an active morbidity and mortality committee supported by written terms of reference.

6.4.1. The health facility morbidity and mortality committee shall maintain a register of the healthcare professional names involved in DNC assessment and diagnosis.

6.4.2. The health facility morbidity and mortality committee shall review the cases of DNC determined and provide recommendations for assessment and management whenever required.

6.4.3. The health facility shall report the ICU mortality rate to DHA on regular basis, as mentioned in this document.

6.4.4. The health facility morbidity and mortality committee shall review the death cases with primary diagnosis of acute cerebral lesion, and not DNC diagnosis, as per **Appendix 2**, and to provide recommendations for DNC diagnosis optimization as per the approved standards.

7. **STANDARD THREE:** HEALTHCARE PROFESSIONALS REQUIREMENTS

7.1. All healthcare professionals involved in the process of organ donation program in Dubai shall hold an active DHA license as per the Professionals Qualification Requirements (PQR) and work within their scope of practice.

7.2. A minimum of three DHA licensed healthcare professionals can perform the brain functions assessment to diagnose DNC.

7.3. Healthcare professional assessing and diagnosing DNC in adult patients shall be physicians from the specialties:

7.3.1. Critical care specialist

7.3.2. Neurology specialist

7.3.3. Neurosurgery specialist

7.3.4. Internal medicine specialist

7.3.5. Anesthesia specialist

7.3.6. Consultant/specialist physicians privileged to diagnose DNC can perform the assessment.

7.4. Healthcare professional assessing and diagnosing DNC in pediatric patients shall be physicians from the following specialties:

7.4.1. Pediatric critical care specialist

7.4.2. Pediatric neurology specialist

7.4.3. Neurosurgery specialist.

7.4.4. Pediatric anesthesia specialist

7.4.5. Pediatric specialist.

7.4.6. Other specialized physicians privileged to diagnose DNC in pediatric patients can perform the assessment.

7.5. One of the three healthcare professionals must be a neuroscience physician (neurology/neurosurgery) to diagnose DNC.

7.6. It is strictly prohibited for transplant healthcare professionals or surgeons to take part in diagnosing DNC or obtaining consent for organ and/or tissue donation.

7.7. The Clinical Privileging committee or Medical Director of the health facility shall privilege the healthcare professionals who performs brain functions assessment to diagnose DNC aligned with their education, training, experience and competencies.

7.8. If the number of healthcare professionals permitted to perform brain functions assessment to determine the DNC are less than three, neurological advice from an external healthcare professional permitted to perform brain death should be requested.

7.8.1. Neurological advice shall only be undertaken once both hospitals have signed a memorandum of understanding. Neurological advice also could be granted by the NCDT from MOHAP.

7.8.2. The nominated hospital performing neurological advice shall have sufficient and competent privileged Healthcare Professionals who are licensed by DHA or another health regulator in the UAE.

7.8.3. Neurological advice shall be free from any conflict of interest that may affect the determination of DNC.

7.9. All healthcare professionals involved in the CCSU shall be trained and aware about the UAE organ donation process management protocol; to standardize the critical care case notification and referral of possible deceased organ donors.

8. **STANDARD FOUR:** REPORTING POSSIBLE AND POTENTIAL DNC DONORS

8.1. All health facilities shall report possible and potential DNC donors.

8.2. Possible DNC donor is an individual of any age who meets the following criteria:

8.2.1. Requires mechanical ventilation.

8.2.2. Has experienced a cerebral lesion with devastating brain lesion (anoxic encephalopathy, cerebral hemorrhage, stroke, traumatic brain injury, encephalitis and meningoencephalitis, central nervous system tumors); and

8.2.3. Glasgow Coma Scale (GCS) of ≤ 8 before the start of sedation or not sedated after starting mechanical ventilation;

8.2.4. Possible donors shall be notified within 12 hours for CCSU at the Health Facility and followed internally.

8.3. Potential DNC donor is an individual of any age who meets the following criteria:

8.3.1. Requires mechanical ventilation;

8.3.2. Has experienced a cerebral lesion with severe neurological insult (anoxic encephalopathy, cerebral hemorrhage, stroke, traumatic brain injury, encephalitis, and meningoencephalitis, central nervous system tumors, etc.);

8.3.3. GSC of ≤ 5 before the start of sedation; or

8.3.4. Any new impairment of any brain stem reflex.

8.4. Potential donors shall be referred within 3 hours via phone call and e-mail or IT solution, using the referral forms of Potential DNC Donor- **Appendices 1 and 3**, to:

8.4.1. CCSU at the Health Facility, and

8.4.2. DHA Organ Donation Coordinator (ODT@dha.gov.ae; +97145027639)

8.4.3. NCDT team (TheOPO@mohap.gov.ae; For support: +971 4 230 1111; +971 54 233 1046; For Back up: +971 54 2331043)

8.5. Referral of potential donors shall include the below clinical evaluation:

8.5.1. Progress note/history of presenting illness (admission until referral)

a. Current Illness (cause of coma, admission day, GCS, death diagnosis performed, etc.).

b. Previous disease.

c. Previous surgeries.

d. Previous clinical treatments.

e. Current or previous cancer disease (kind, time, treatment).

f. Current or previous diagnosis of chronic diseases (kind, time, treatment).

g. Previous drug consumption (alcohol, tobacco, etc.).

8.5.2. Current clinical status

a. Vital signs

b. Current treatments (antibiotics, use of inotropes, continuous renal replacement therapy (CRRT), etc.)

8.5.3. Imaging exams: Brain and/or Chest CT Scan, Thorax X-ray, echocardiogram (ECG), abdominal ultrasound or other

8.5.4. Laboratory results:

a. Complete blood count

b. Coagulation profile (PT/PTT/INR)

c. Electrolyte & renal profile

(sodium/potassium/calcium/magnesium/creatinine/urea/eGFR)

d. Liver profile (total protein/albumin/total bilirubin/ALT/AST/ALP)

e. Pancreas profile (amylase/HbA1c)

f. Blood gases

g. ECG

8.5.5. Cultures (blood/urine/sputum/wound) and other cultures such as Cerebrospinal Fluid (CSF)

8.5.6. COVID-19 PCR

8.5.7. QuantiFERON-TB

8.5.8. Urine analysis

8.5.9. Biopsy reports, if done

8.6. ICU attending physician or Most Responsible Physician (MRP) must inform the donor's family about the suspected diagnosis of DNC and, when proven, the definitive diagnosis.

8.7. The CCSU shall maintain a donor registry of all possible and potential DNC Donors.

8.7.1. The CCSU shall maintain proper communication between DHA and NCDT.

8.7.2. The CCSU shall report the related KPIs regularly to DHA, as mentioned in this document.

8.7.3. The CCSU shall ensure that the assessment form and the DNC declaration is completed and signed regardless of the outcome of the assessment and shall ensure uploading those forms into the patient health record.

9. **STANDARD FIVE:** ASSESSMENT OF DEATH BY NEUROLOGICAL CRITERIA (DNC)

9.1. The clinical assessment shall be carried out as per the Ministerial Decision No. (19) of 2022 regarding Death Diagnosis Criteria.

9.2. The healthcare professional shall intensify the management of saving the organ's viability during the critical period of diagnosing the DNC.

9.3. Consent of the next of kin is not a requirement to perform the DNC assessment.

9.4. Prerequisite for DNC Assessment -**Appendix 4:**

9.4.1. Prior to requesting the assessment, the MRP, or deputy, shall ensure that all the pre-assessment conditions are met.

9.4.2. The pre-assessment conditions are:

a. The patient is in a state of deep coma due to a known reason.

b. The patient is dependent on mechanical ventilation and cannot trigger spontaneous respiration.

c. A duration of at least six hours has elapsed since the event leading to coma, and to state clearly the reason of DNC (head injury, cerebral bleeding, etc.).

d. The patient is not in untreated cardiovascular shock.

e. Biochemical tests are not indicative of significant metabolic or endocrine derangements.

f. The patient shall not respond to any form of stimuli, except for the presence of spinal reflexes.

g. Loss of brain stem reflexes with the possibility of having some minimal spinal cord reflexes.

9.5. Exceptions for DNC Assessment:

9.5.1. The patient's body temperature shall not be hypothermic, with an internal body temperature equal or equal to, or greater than, 36 degrees Celsius for diagnosing death resulting from complete and final cessation of all brain

functions. If the body temperature was lower than 36 degrees, the patient shall be warmed to raise the temperature, to allow metabolism of pharmacological agents.

9.5.2. The patient shall not be under the elevated influence of any sedatives, anxiolytics, hypnotics, narcotics, antiepileptics, muscle relaxants, central nervous system depressants or anti-depressants.

a. If the history is positive for ingestion/administration of any of above agents, then the influence of such agents shall be excluded either by a laboratory test, ancillary test or awaiting five half-lives (the longest half-life from those mentioned in **Appendix 5**) from the last time an agent was ingested/administered after discontinuing the use of the drug, in the absence of acute liver or renal failure, and hypothermia prior to conducting the assessment.

b. To explore revert action of the agent (e.g. giving drug specific antidote).

9.5.3. A toxicity test shall be performed in cases of road traffic accident, suspected medication toxicity, or cases of unknown loss of consciousness.

9.5.4. Exempt patients with significant metabolic/endocrine abnormalities.

9.5.5. Patients with clear evidence of decerebration or decortication posture.

9.5.6. For any case, if the healthcare professional has not established a clear exception condition it is required to communicate with the NCDT for expert opinion.

9.6. The assessment of DNC shall be performed by filling and signing the Brain Functions Assessment Form -**Appendix 4**.

9.7. Death by Neurological Criteria has three essential findings: presence of coma, absence of brainstem reflexes, and presence of apnea.

9.7.1. Two clinical examinations, separated by age-defined intervals, shall be carried out using the Brain Function Assessment Form of DNC -**Appendix 4**.

a. A minimum of three healthcare professionals shall perform the clinical examination.

b. First clinical examination; physician (1) and physician (2).

c. Second clinical examination; physician (3) with one of the above physicians or physician (4).

9.7.2. If the first two clinical examinations are completed and all the tests have been completed without constraints, the apnea test shall be performed, to verify the absence of brainstem reflexes, and to confirm DNC -**Appendix 4**.

9.7.3. Apnea test shall be conducted once by two of the three healthcare professionals following the second physician assessment **-Appendix 8.**

9.7.4. The ancillary test is not mandatory, it is only performed if the clinical exam parts or apnea test cannot be done, as stated in the Ministerial Decree No.19 of 2022 to diagnose death by brain criteria - **Appendix 4**.

9.8. If there is no possibility of completing the two clinical examinations or the apnea test cannot be performed for any reason, then:

9.8.1. It is required to perform one of the ancillary tests, as stated in the Ministerial Decree No.19 of 2022 to diagnose death by brain criteria - **Appendix 4**.

9.8.2. One of the ancillary tests can likewise be used in case of insurmountable constraints and of uncertainty as to the interpretation of the presence of spinal reflexes and/or myoclonus before the apnea test is performed, as per the Ministerial Decision No. (19) of 2022 regarding Death Diagnosis Criteria.

9.9. In paediatric age groups, it is recommended that the minimum criteria for determination of DNC be the same as in adults, with:

9.9.1. Assessment of prerequisites;

9.9.2. Elimination of confounders; and

9.9.3. Performance of a clinical examination, including apnea testing (age-appropriate hemodynamic targets shall be applied) and ancillary tests.

9.9.4. All health facility shall facilitate the reassessment of the DNC patient by the NCDT.

10. **STANDARD SIX:** DNC DECLARATION AND ISSUANCE OF DEATH CERTIFICATE

10.1. If a person declared dead by neurological criteria meets the criteria for organ donation, the process shall proceed as follows: **Appendix 3**.

10.1.1. The CCSU shall facilitate the availability of medical reports and tests of the DNC and to be shared with the NCDT.

10.1.2. If the patient was not a registered organ donor, a grace period of up to 48 hours shall be given to the family to respond about decision on organ donation.

10.1.3. The unified consent form for organ donation is obtained by the NCDT from the next of kin in the presence of the MRP, or deputy to proceed with the donation -**Appendix 6**.

10.1.4. The guardian of the person who fully or partially lacks legal capacity may reverse the donation without any restriction before removing the organ, part thereof, or human tissue, by Federal Decree by Law No. (25) of 2023, concerning Donation and Transplantation of Human Organs and Tissues.

10.1.5. It is not permissible to request the return of what was removed or extracted after donating it in accordance with the provisions of this law by decree.

10.1.6. The CCSU shall facilitate the referral and transfer of the person declared dead by neurological criteria to the organ retrieval facility for organ surgical retrieval and transplantation.

10.1.7. If the person declared dead by neurological criteria does not meet the criteria for organ donation or if the next of kin does not give consent for the organ donation, then life-sustaining equipment is withdrawn, in compliance with Article No. (10) Point 2 of the UAE Federal Decree Law No. (4) of 2016 on Medical Liability **- Appendix 7.** Assessment and the consent not being granted by the next kin shall be clearly documented in the patient's medical record and maintained.

10.1.8. The health facility shall train the ICU physicians in effective communication in breaking bad news skills in this regard with the family and next of kin.

10.1.9. ICU physicians shall ensure compliance of the directions set out in these standards and relevant legislations to avoid violations and legal implications.

10.2. Issuance of the death certificate:

10.2.1. The death certificate shall be issued after the DNC declaration is duly signed and as per the following:

a. If the consent for organ donation is obtained after the consultation with NCDT, it is issued within 6 hours before proceeding to the operating room for organ retrieval.

b. If the organ donation is declined the death certificate is issued after the withdrawal of all critical care support.

11. **STANDARD SEVEN:** POTENTIAL DONOR MANAGEMENT

11.1. Health facility shall have a donor management protocol implemented in all critical care units (ICU, PICU, stroke/cardiac unit, etc.).

11.2. The health facility shall train the physicians and nurses of critical care units on donor management protocol.

11.3. The possible and potential donors shall be managed with the same principles of general intensive care and neurocritical care based on international best practices.

11.4. The management of a potential donor shall be carried out as per the Donor Management Protocol by the National Center for Organ Donation and Transplantation – MOHAP.

11.5. Effective potential donor management includes, but is not limited, the following:

11.5.1. Early and aggressive volume replacement.

11.5.2. Use of vasopressors, if necessary, to maintain hemodynamic stability.

11.5.3. Lung-protective treatment and ventilation.

11.5.4. Control of electrolytes and metabolic disorders.

11.5.5. Hormonal therapy.

11.5.6. Hypothermia prevention and treatment.

11.5.7. Infections screening and therapy.

11.5.8. Blood transfusion, if necessary.

11.5.9. Diabetes insipidus.

11.6. Critical care physicians shall manage potential donors with two main goals: improving the overall suitability for donation and enhancing the viability of organs and tissues.

12. **STANDARD EIGHT:** FAMILY COMMUNICATION

12.1. Health facilities shall have a breaking bad news protocol implemented in all critical care units (ICU, PICU, stroke unit, etc.).

12.2. The health facility shall train the ICU physicians and nurses on effective communication skills regarding the family and next of kin.

12.3. The health facility must have a private separate room, preferably in the ICU or nearby, where family communications to explain DNC and the consent for donation.

12.4. The CCSU shall facilitate communication between the family, ICU team, and NCDT.

12.5. Communication of brain injury severity and a poor prognosis shall begin upon admission and be maintained on an ongoing basis with the family.

12.6. Breaking bad news must be performed by the attending ICU physician, taking into account the family's needs and respecting culture, religion, and any other specificities.

12.7. Before delivering bad news, it must be ensured that the patient has been declared dead based on neurologic criteria as stipulated by the Ministerial Decision No. (19) of 2022 concerning the Criteria for the Diagnosis of Death.

12.8. The DNC declaration and breaking bad news are medical liabilities and shall be done independently of the patient's eligibility for organ and tissue donation.

12.9. If there are no family members available in the UAE, contact the coordinators of the NCDT for support in finding an authorized family member outside of the UAE (For support: +971 4 230 1111; +971 54 233 1046; For Back up: +971 54 2331043).

12.10. An effective and empathic family communication for delivering the bad news must have the following elements:

12.10.1. Adapt the message to the family's level of understanding;

12.10.2. Show respect to beliefs of any kind;

12.10.3. Involve the family in the process;

12.10.4. Be concise;

12.10.5. Use open questions;

12.10.6. Review the family's understanding;

12.10.7. Summarize the key points and establish a plan of action.

12.11. The family interview for organ donation will only be conducted by team designated by NCDT - **Appendix 3**.

12.12. Family interview for organ donation must be performed after breaking bad news and after the family understands the DNC and is ready.

12.13. ICU team, multidisciplinary team (social worker, psychologist) and CCSU shall provide maximum and continuous family support.

12.14. If relatives of UAE Residents have migration backgrounds:

12.14.1. Overcome language barriers through official translator.

12.14.2. Choose a family contact person.

12.14.3. Clarify cultural and religious needs, as needed.

13. STANDARD NINE: DBD ORGAN AND TISSUE RETRIEVAL

13.1. Health facility that performs DBD Retrieval shall have organ and tissue retrieval, packaging and transportation protocol implemented.

13.2. The health facility shall train all healthcare professionals involved in organ retrieval process on organ and tissue retrieval, packaging and transportation protocol.

13.3. Involved agents and responsibilities:

13.3.1. Organ Retrieval Team (ORT): specialized group responsible for carrying out the surgical retrieval of organs from deceased donors. ORT ensures that organs are procured in alignment with medical protocols and legal standard.

13.3.2. Operating room nursing team: participates in various activities during the retrieval process, such as preparing the donor for organ and tissue retrieval, supporting the RT, and providing necessary instrumentation.

13.3.3. Critical Care Support Unit Coordinator (CCSUC) in donor hospital:

a. Oversees the entire process, from preparing logistics before the retrieval begins, transferring the donor, and ensuring all documentation is complete.
b. Is responsible for ensuring organs and tissues reach their final destination in optimal condition.
c. Is also responsible for the family's well-being and information during the retrieval process.

13.3.4. CCSUC in retrieval center:

a. Participates and coordinates the logistics for the movement of the retrieval team, which may or may not coincide with the transplant center.
b. The retrieval center is also responsible for providing the necessary resources for the retrieval.

13.3.5. Critical care nursing team: Participates in preparing the donor for transfer to the operating room.

13.4. The organ and tissue retrieval concludes with the careful reconstruction of the body according to the law and ethical principles, and then its delivery to the family (including transfer to the wake location and notification to the funeral home; in judicial cases, notification of the completion of retrieval to the court).

13.5. ORT and coordination of the retrieval center shall make sure that all necessary documentation for organ retrieval is completed before the procedure:

13.5.1. Death certificate.

13.5.2. Consent to Donate a Deceased Person Organs and Tissues.

13.5.3. Donor information dossier for each team.

13.5.4. NCDT authorization for organ and tissue retrieval.

13.6. Coordination of the retrieval center shall ensure all additional documentation for organ retrieval documentation is completed after the procedure:

13.6.1. Medical report of organ and tissue retrieval specifying organs and tissues were retrieved and procedure's summary.

14. STANDARD TEN: ORGAN AND TISSUE DONATION REGISTRY AND KEY PERFORMANCE INDICATORS – DONATION AFTER BRAIN DEATH (DBD)

14.1. Percentage of Trained ICU staff on the DHA Standards for Human Organs & Tissues Donation Services, and relevant policies and procedures

Percentage of Trained ICU staff on the DHA Standards for Human Organs & Tissues Donation Services, and relevant policies and procedures	
Main Domain:	Structure
Subdomain:	Effectiveness
Indicator Definition:	Availability of internal policies and procedures that cover all relevant donation steps and as per DHA Standards which include but are not limited to: 1. Potential donor identification and referral. 2. Death Determination by Neurological Criteria. 3. Potential donor evaluation. 4. Potential donor maintenance. 5. Breaking bad news. 6. Family approach. 7. Operating theatre organization. 8. Communication between ICU professionals, CCSU and EOTC; and 9. Organ packaging and transportation (if applicable). Training ICU staff on the Standards for Human Organs & Tissues Donation Services, policies, and procedures promotes better practice.
Calculation:	Numerator: number of ICU staff trained on DHA Standards for Human Organs & Tissues Donation Services, and relevant internal policies and procedures. Denominator: total number of ICU professionals.
Target:	70%

Methodology:	Numerator/denominator x100
Measuring Unit:	Percentage of trained ICU staff
Reporting Frequency:	Monthly
Desired Direction:	Higher is better
Rationale:	Training ICU staff ensures adherence to DHA Standards, improving overall practice and ensuring that all steps of the donation process are handled appropriately and efficiently.
KPI Source:	DHA Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

14.2. Identification of All Possible Death by Neurological Criteria (DNC) Donors in the ICU

Identification of All Possible Death by Neurological Criteria (DNC) Donors in the ICU	
Main Domain:	Process
Subdomain:	Efficiency and effectiveness
Indicator Definition:	Percentage of patients with cerebral lesions admitted to the ICU who are identified and reviewed by CCSUC within 12 hours of meeting the clinical criteria and a notification is sent to CCSU at the health facility. Clinical criteria for identification of critical care cases who are possible organ donors: • Comatose patients: A patient with GCS of ≤ 8 upon admission to the health facilities or during ICU management not caused by sedation. • Devastating cerebral lesion: Any cerebral lesion potentially causing (or being a cofactor of or complication) brain death in the ICU. This also includes as per the definitions and ICD 10 codes (Appendix 1). • Look for other next of kins of bad prognosis in sedated patients such as pupil dilatation, hemodynamic deterioration, absence of any cranial nerve reflexes.
Calculation:	Numerator: number of comatose patients with devastating cerebral lesion admitted to the ICU meeting the criteria for identification who are identified and notified by the CCSUC within 12 hours of meeting the clinical criteria. Denominator: total number of comatose patients with cerebral lesion admitted to the ICU meeting the criteria for identification of critical care cases.

Target:	100%
Methodology:	Numerator/denominator x100
Measuring Unit:	Percentage of identified possible donors
Reporting Frequency:	Monthly
Desired Direction:	100% is expected
Rationale:	Timely identification of possible donors is critical to maximizing the number of organ donors and reducing donor loss.
KPI Source:	DHA Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

14.3. Percentage of Death Declaration by Neurological Criteria

Percentage of Death Declaration by Neurological Criteria	
Main Domain:	Process
Subdomain:	Effectiveness and continuity of care
Indicator Definition:	Percentage of patients with cerebral injury or lesion declared dead by neurological criteria (DNC) through filling the Death by Neurological Criteria Documentation Form.
Calculation:	Numerator: number of patients with cerebral injury or lesion declared dead by neurological criteria. Denominator: total number of deaths of patients with cerebral injury or lesion.
Target:	50%
Methodology:	Numerator/denominator x100
Measuring Unit:	Percentage of DNC deaths
Reporting Frequency:	Monthly
Desired Direction:	-
Rationale:	Metric of effectiveness. Accurate and timely death declaration by neurological criteria is crucial for identifying potential donors and ensuring correct diagnoses, benefiting both donation numbers and families.
KPI Source:	DHA Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

14.4. Percentage of Referral of Potential Death by Neurological Criteria Donor

Percentage of Referral of Potential Death by Neurological Criteria Donor	
Main Domain:	Process
Subdomain:	Effectiveness
Indicator Definition:	Percentage of potential DNC donors who are referred to: • CCSU at health facilities in Dubai. • DHA organ donation coordinator; and • NCDT As per the criteria as soon as possible, and not exceeding 3 hours. Clinical criteria for referral of critical care cases who are potential dnc donors: • GCS ≤ 5 before sedation and intubated and cerebral lesion (ICD 10 codes, Appendix 1); or new impairment of brain stem reflex
Calculation:	Numerator: number of potential DNC donors referred to NCDT or CCSU within 3 hours, since the patient presents clinical triggers. Denominator: total number of potential DNC donors meeting the criteria for referral.
Target:	100%
Methodology:	Numerator/denominator x100
Measuring Unit:	Percentage of referred potential DNC donors
Reporting Frequency:	Monthly
Desired Direction:	Higher is better
Rationale:	Metric of process effectiveness. Referring potential donors promptly is essential to begin the donation process and optimize opportunities for organ recovery.
KPI Source:	DHA Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

14.5. Unexpected cardiac arrest

Unexpected cardiac arrest	
Main Domain:	Outcome
Subdomain:	Maintenance
Indicator Definition:	Percentage of potential DBD donors who suffered an unanticipated cardiac arrest while in the ICU. It highlights the importance of proper handling by ICU personnel to prevent cardiac arrest and the subsequent loss of potential donors.
Calculation:	Numerator: Number of potential BDB donors who suffered an unanticipated cardiac arrest Denominator: Total number of potential DBD donors
Target:	≤3%
Methodology:	Numerator/denominator x100
Measuring Unit:	Percentage of unanticipated cardiac arrests among potential DBD donors
Reporting Frequency:	Monthly
Desired Direction:	Lower is better
Rationale:	Metric of process effectiveness. Preventing unanticipated cardiac arrest is crucial for maintaining donor viability and reducing loss of potential donors.
KPI Source:	DHA Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

14.6. Quarterly meetings of the donor hospital committee

Quarterly Meetings of the Donor Hospital Committee	
Main Domain:	Structure
Subdomain:	Effectiveness
Indicator Definition:	Number of meetings conducted by the donor hospital committee to review and improve organ donation processes.
Calculation:	Count of meetings held per quarter.
Target:	4 meetings per year (1 per quarter)
Methodology:	Review meeting records for dates and agendas
Measuring Unit:	Number of meetings
Reporting Frequency:	Quarterly
Desired Direction:	Maintain 4 meetings per year
Rationale:	Regular meetings provide structured oversight and continuous alignment with DHA standards.
KPI Source:	DHA Standards for Human Organs & Tissues Donation Services (Deceased Donor) – Donation after Brain Death (DBD)

REFERENCES

1. European Committee (Partial Agreement) on Organ Transplantation (CD-P-TO) (2022) *Guide to the Quality and Safety of Organs for Transplantation*. 8th edn. Strasbourg: European Directorate for the Quality of Medicines & HealthCare (EDQM), Council of Europe.
2. Federal Decree Law No. (25) of 2023. *Regarding Donation and Transplantation of Human Organs and Tissues*.
3. Federal Law No. (4) of 2016. *Medical Liabilities*. Articles 10 and 11.
4. Greer, D.M., Shemie, S.D., Lewis, A., et al. (2020) 'Determination of Brain Death/Death by Neurologic Criteria: The World Brain Death Project', *JAMA*, 324(11), pp. 1078–1097.
5. Manyalich, M., Guasch, X., Gomez, M.P., Páez, G. and Teixeira, L.; ODEQUS Consortium (2013) 'Organ Donation European Quality System: ODEQUS project methodology', *Transplantation Proceedings*, 45(10), pp. 3451–3455.
6. Ministry of Health and Prevention (2022) *Ministerial Decision No. (19) of 2022, Death Diagnosis Criteria*.
7. Organ Donation European Quality System (ODEQUS) 'Quality Criteria and Quality Indicators in Organ Donation'. Available at: http://www.odequs.eu/results.html (Accessed: 6/11/2024)
8. Organ Procurement and Transplantation Network (OPTN) (2024) 'Bylaws and Guidelines for Organ Procurement and Transplantation Network'. Available at: https://optn.transplant.hrsa.gov/governance/bylaws/ (Accessed: 6/11/2024).

9. Pediatric and Adult Brain Death/Death by Neurologic Criteria Consensus Guideline, Report of the AAN Guidelines Subcommittee, AAP, CNS, and SCCM (2023) 'Pediatric and Adult Brain Death/Death by Neurologic Criteria Consensus Guideline', *Neurology*, 101(24), pp. 1112–1132.
10. Spanish Society of Intensive Care Medicine, Critical Care, and Coronary Units (SEMICYUC) 'Recommendations and Guidelines on Intensive Care and Organ Donation'. Available at: https://semicyuc.org/recomendaciones/ (Accessed: 6/11/2024).
11. Wijdicks, E.F.M., Varelas, P.N., Gronseth, G.S. and Greer, D.M. (2010) 'Evidence-based guideline update: determining brain death in adults: report of the Quality Standards Subcommittee of the American Academy of Neurology', *Neurology*, 74(23), pp. 1911–1918.
12. World Health Organization (WHO) 'Guidelines and Recommendations on Human Organ Transplantation'.

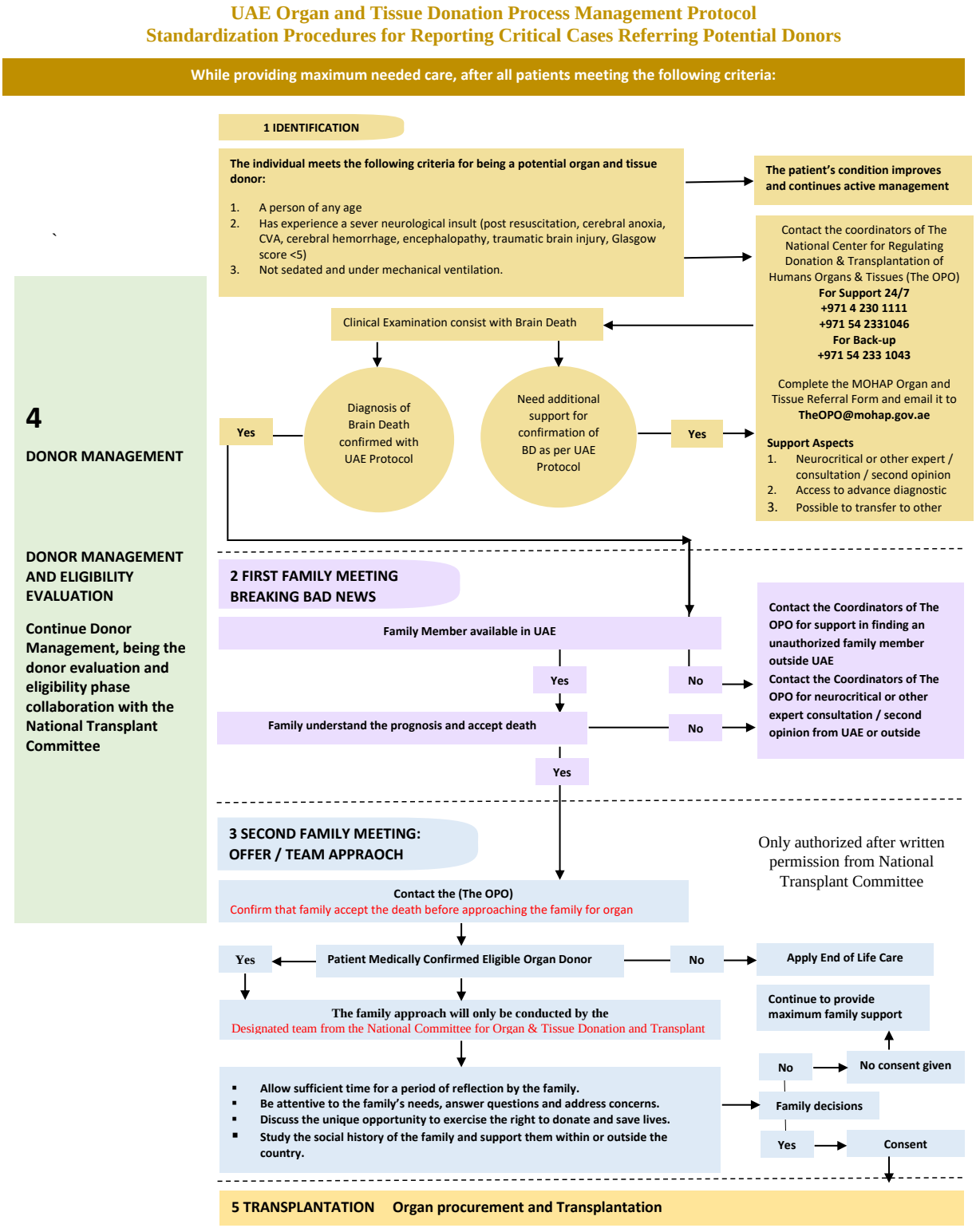
APPENDIX 1: POTENTIAL DECEASED BRAIN DEATH (DBD) DONORS REFERRAL FORM

Potential Deceased Brain Death (DBD) Donors Referral Form				
The individual meets the following criteria for being a potential organ donor: 1. A person of any age 2. Has experienced a severe neurological insult (post resuscitation, cerebral anoxia, CVA, cerebral hemorrhage, encephalopathy, traumatic brain injury, Glasgow scale ≤5), not sedated and under mechanical ventilation				
Referral Date			**Referral Time**	
Referring Hospital			**Location/Unit**	
Patient Name			**MRN**	
Nationality			**Gender**	☐ **Male** ☐ **Female**
Date for Birth		**Age**	**ICU Admission Date**	
Police Case	☐ **Yes** ☐ **No**		**Blood Group**	
Cause of Brain Injury				
Other, please specify				
Next of Kin Available	☐ **Yes** ☐ **No**		**Outside**	☐ **Yes** ☐ **No**
Next of Kin Name				
Next of Kin Relationship				
Next of Kin Contact Number				
MRP Name				
MRP Contact Number				
CCSU Coordinator Name				
CCSU Coordinator Contact Number				
Please complete the form and send it back to The National Center for Regulating Donation and Transplantation of Humans Organs and Tissues at the following email **TheOPO@mohap.gov.ae** For any clarification please contact the hot line number **+971 4 230 1111**				

APPENDIX 2: DEATHS WITH ACUTE CEREBRAL LESION ICD- 10 CODES

Trauma	S02	Fracture of Skull and Facial Bones
	S061	Traumatic Cerebral Oedema
	S062	Diffuse Brain Injury
	S063	Focal Brain Injury
	S064	Extradural Hemorrhage
	S067	Intracranial Hemorrhage with Prolonged Coma
	S068	Other Intracranial Injuries
	S069	Intracranial Injuries Unspecified
Cerebrovascular Accidents	I60	Subarachnoid Hemorrhage
	I61	Intracranial Hemorrhage
	I62	Other Non-Traumatic Intracranial Hemorrhage
	I63	Cerebral Infarction
	I64	Stroke Not Specific as Stroke or Infraction
	I65	Occlusion And Stenosis of Precerebral Arteries
	I66	Occlusion And Stenosis of Cerebral Arteries
Cerebral Damage	G931	Anoxic Brain Damage
	G935	Compression of Brain
	G936	Cerebral Oedema
Cerebral Neoplasm	C71	Malignant Neoplasm Of The Brain
	D33	Benign Neoplasm of the Brain
Infections	G00-G0	Meningitis
	GO6.0	Intracranial abscess and granuloma

APPENDIX 3: UAE ORGAN AND TISSUE DONATION PROCESS MANAGEMENT PROTOCOL: STANDARDIZED PROCEDURES FOR REPORTING CRITICAL CASES AND REFERRING POTENTIAL DONORS



APPENDIX 4: BRAIN FUNCTIONS ASSESSMENTS FORM OF DEATH BY NEUROLOGICAL CRITERIA

Please write patient details below in addition to ID sticker

Name:			**Medical Record number:**		
Age: _____	**Sex:** ☐ **Male** ☐ **Female**	**Nationality:** _____	**Blood group**: _____	**Weight:**__**Kg**	**Height:**___**cm**
Hospital Name:			**Date of admission (DD/MM/YYYY):**		

First Exam	**First physician**		**Second physician**	
I. PRECONDITIONS:				
1. Clinical or neuroimaging evidence of acute Central Nervous System (CNS) catastrophe that is compatible with irreversible loss of brain function.	☐ Yes	☐ No	☐ Yes	☐ No
2. ≥ 6 hours have passed since the initial insult.*	☐ Yes	☐ No	☐ Yes	☐ No
3. Coma with no spontaneous respiration.	☐ Yes	☐ No	☐ Yes	☐ No
II. EXCLUSIONS:				
1. Hypothermia (core temperature ≤ 36°C).	☐ Absent	☐ Present	☐ Absent	☐ Present
2. Sedation or muscle relaxants (blood test or hospital record shall indicate absence of significant levels of sedative drugs, muscle relaxants or intoxication).	☐ Absent	☐ Present	☐ Absent	☐ Present
3. Systolic blood pressure <100 mmHg (despite vasopressors).	☐ Absent	☐ Present	☐ Absent	☐ Present
4. Significant metabolic or endocrine causes of coma. (suggested sodium ≤ 155 mmol/L or mEq/L).	☐ Absent	☐ Present	☐ Absent	☐ Present
III. CLINICAL ASSESSMENT:				
1. Absence of any cerebrally-mediated response to auditory and tactile noxious stimulation, peripherally and in the cranium. (does not include spinal reflexes)	☐ Absent	☐ Present	☐ Absent	☐ Present
2. Absence of brain stem reflexes:				
a. Pupils response to bright light	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
b. Corneal	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
c. Oculocephalic (contraindicated when C-spine unstable)	☐ Absent ☐ Untestable	☐ Present	☐ Absent	☐ Present
d. Oculovestibular (tympanic membranes must be intact) (50 ml adults 20 ml in children ice-cold water 0°C)	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
e. Gag	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
f. Cough	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present

UAE Federal Law No.5/2016 article 15.2: death is determined by a committee of 3 physicians including 1 specialized in neurological disease.

***Note**: **Recommended time interval between first and second examinations in various age groups**

Adults: minimum of 30 minutes ** Infants (above 60 days – 1 year) 24 hours

Children (above one year) 12 hours ** neonate (7 days – 60 days) 48 hours

First exam	Date	Time	Name	Signature	License number
First physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MMAM/PM			
Second physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MMAM/PM			

Name:			**Medical Record number:**		
Age: _____	**Sex:** ☐ **Male** ☐ **Female**	**Nationality:** _____	**Blood group**: _____	**Weight:**__**Kg**	**Height:**___**cm**
Hospital Name:			**Date of admission (DD/MM/YYYY):**		

Second Exam	**Third physician**		**First or Second physician**	
I. PRECONDITIONS:				
1. Clinical or neuroimaging evidence of acute Central Nervous System (CNS) catastrophe that is compatible with irreversible loss of brain function.	☐ Yes	☐ No	☐ Yes	☐ No
2. ≥ 6 hours have passed since the initial insult.*	☐ Yes	☐ No	☐ Yes	☐ No
3. Coma with no spontaneous respiration.	☐ Yes	☐ No	☐ Yes	☐ No
II. EXCLUSIONS:				
1. Hypothermia (core temperature ≤ 36°C).	☐ Absent	☐ Present	☐ Absent	☐ Present
2. Sedation or muscle relaxants (blood test or hospital record shall indicate absence of significant levels ofsedative drugs, muscle relaxants or intoxication).	☐ Absent	☐ Present	☐ Absent	☐ Present
3. Systolic blood pressure <100 mmHg(despite vasopressors).	☐ Absent	☐ Present	☐ Absent	☐ Present
4. Significant metabolic or endocrine causes of coma.(suggested sodium ≤ 155 mmol/L or mEq/L).	☐ Absent	☐ Present	☐ Absent	☐ Present
III. CLINICAL ASSESSMENT:				
1. Absence of any cerebrally-mediated response to auditory and tactile noxious stimulation, peripherally and in the cranium. (does not include spinal reflexes)	☐ Absent	☐ Present	☐ Absent	☐ Present
2. Absence of brain stem reflexes:				
a. Pupils response to bright light	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
b. Corneal	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
c. Oculocephalic (contraindicated when C-spine unstable)	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
d. Oculovestibular (tympanic membranes must be intact) (50 ml adults 20 ml in children ice-cold water 0°C)	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
e. Gag	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present
f. Cough	☐ Absent ☐ Untestable	☐ Present	☐ Absent ☐ Untestable	☐ Present

UAE Federal Law No.5/2016 article 15.2: death is determined by a committee of 3 physicians including 1 specialized in neurological disease.

***Note: Recommended time interval between first and second examinations in various age groups**

Adults: minimum of 30 minutes ** Infants (above 60 days – 1 year) 24 hours

Children (above one year) 12 hours ** neonate (7 days – 60 days) 48 hours

Second exam	Date	Time	Name	Signature	License number
Third physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MM AM/PM			
First or Second physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MM AM/PM			

Note: First or Second physician could be replaced by fourth doctor if applicable.

Name:			**Medical Record number:**		
Age: _____	**Sex:** ☐ **Male** ☐ **Female**	**Nationality:** _____	**Blood group**: _____	**Weight:**__**Kg**	**Height:**___**cm**
Hospital Name:			**Date of admission (DD/MM/YYYY):**		

APNEA TEST:

Must be performed in the presence of two physicians and done once only.

If inconclusive and patient remains hemodynamically stable, may continue for longer period (5 -10 minutes).

If not doable due to hemodynamic instability or aborted, the reported ancillary test will be sufficient.

A. Prerequisites		
1. Core temperature ≥ 36°C	☐ Yes	☐ No
2. Systolic BP > 100 mmHg (with or without vasopressor agents)	☐ Yes	☐ No
3. Arterial pCO2 40 +/- 5 mm Hg (5.3 +/- 0.7 kPa) (In patient with normal baseline PCO2)	☐ Yes	☐ No
4. Arterial pO2 greater than 90 mm Hg (12 kPa)	☐ Yes	☐ No
5. Expose chest and abdomen	☐ Yes	☐ No
B. Apnea testing checklist		
1. Pre-oxygenate with 100% O2 for 10 minutes. Increase the inspired fraction of oxygen (FI02)without changing the ventilation rate PaO2 >200 mm Hg (26.7 kPA)	☐ Yes	☐ No
Disconnect patient from ventilator and deliver 100% FiO_2 into the trachea via a cannula atthe level of the carina. (6 L/min adults, 1.5 -2 L/min children)	☐ Yes	☐ No
*Abort the apnea test, immediately reconnect the ventilator and take arterial blood gas sample ifany: Systolic BP < 90 mmHg or cardiovascular collapse despite vasopressors Oxygen desaturation (<85% for >30 seconds) Significant cardiac arrhythmia Respiratory movements are observed	**Apnea test aborted:** ☐ Yes ☐ No	
3. Check arterial blood gases at 8-10 minutes and every 5 minutes thereafter if necessary.Reconnect the ventilator when either:		
a. pCO2 ≥ 60 mmHg (8.1 kPa) adults or ≥ 50 mmHg (7.6 kPa) children	☐ Yes	☐ No
b. pCO2 is ≥ 20 mmHg (2.7 kPa) above the patient's known baseline (in patient with high baseline PaCO2)	☐ Yes	☐ No

1. ABG at baseline: DD/MM/YYYYHH:MM AM/PMpH _____ PaCO2_____mmHgPaO2 _____mmHg	**2. ABGat 10 minutes or shorter if aborted[1]:** DD/MM/YYYY HH:MM AM/PM pH _____ PaCO2_____mmHgPaO2_____mmHg [1]Please specify:_____minutes	**3. ABG at 5 minutes (optional)[2]:** DD/MM/YYYY HH:MM AM/PM pH _____ PaCO2_____mmHgPaO2 _____mmHg [2]Refer to point bat the top of thispage

C. Apnea confirmed: absent respiratory movements over ≥10 minutes of observation.	☐ Yes	☐ No

APNEA TEST completed by	**Date**	**Time**	**Name**	**Signature**	**License number**
First physician	DD/MM/YYYY	HH:MM AM/PM			
Second physician	DD/MM/YYYY	HH:MM AM/PM			

**UAE Federal Law No.5/2016 article 15.2: death is determined by a committee of 3 physicians including 1 specialized in neuro logicaldisease.

***One of the four clinical exams separated by mandatory waiting time for age (see footnote) to be completed by a specialist inneurological disease.

****The final declaration needs to be signed by all three physicians who performed clinical examinations and apnea test.
*****First or Second physician could be replaced by fourth doctor if applicable.

***Note: Recommended time interval between first and second examinations in various age groups**

Adults: minimum of 30 minutes ** Infants (above 60 days – 1 year) 24 hours

Children (above one year) 12 hours ** neonate (7 days – 60 days) 48 hours

Name:			**Medical Record number:**		
Age: _____	**Sex:** ☐ **Male** ☐ **Female**	**Nationality:** _____	**Blood group**: _____	**Weight:**__**Kg**	**Height:**___**cm**
Hospital Name:			**Date of admission (DD/MM/YYYY):**		

ANCILLARY TEST(S): IF REQUIERED, minimum one of the following tests shall be done.			**Report attached**
1. **EEG (full brain death protocol, see last page)**	☐ No reactivity (>2 uV) to intense somatosensory or audiovisualstimuli.	DD/MM/YYYY	☐ Yes ☐ No
2. **Absence of brain circulation by any of:**			
2.1 Cerebral angiogram	☐ No flow	DD/MM/YYYY	☐ Yes ☐ No
2.2 Nuclear medicine cerebral blood flow study (technetium 99MSPECT)	☐ No flow	DD/MM/YYYY	☐ Yes ☐ No
2.3 Transcranial Doppler	☐ No flow	DD/MM/YYYY	☐ Yes ☐ No
2.4 CT cerebral angiogram (see appendix)	☐ No flow	DD/MM/YYYY	☐ Yes ☐ No

Final Declaration	**Date**	**Time**	**Name**	**Signature**	**License number**
First physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MMAM/PM			
Second physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MMAM/PM			
Third physician ☐ An intensivist ☐ Neurologist ☐ Neurosurgeon ☐ Others specify:	DD/MM/YYYY	HH:MMAM/PM			
Fourth physician (if applicable)	DD/MM/YYYY	HH:MMAM/PM			

***Note: Recommended time interval between first and second examinations in various age groups**

Adults: minimum of 30 minutes ** Infants (above 60 days – 1 year) 24 hours

Children (above one year) 12 hours ** neonate (7 days – 60 days) 48 hours

Electroencephalography

- A minimum of 8 scalp electrodes should be used.
- Interelectrode impedance should be between 100 and 10,000 Ω.
- The integrity of the entire recording system should be tested.
- The distance between electrodes should be at least 10 cm.
- The sensitivity should be increased to at least 2 μV for 30 minutes with inclusion of appropriate calibrations.
- The high-frequency filter setting should not be set below 30 Hz, and the low-frequency setting should not be above 1 Hz.
- Electroencephalography should demonstrate a lack of reactivity to intense somatosensory or audiovisual stimuli.

Neurology 2010;74:1911-1928

Types and Techniques of CTA

A standard CTA acquisition uses a multislice CT scanner to acquire a helical scan (120 kV, 200 mA) from cervical vertebra C2 to vertex timed to chase the bolus of contrast as it passes through the intracranial vessels. Intravenous contrast medium (40-120 mL) is administered in an antecubital vein or a central venous catheter with a power injector, followed by 30 mL of an isotonic saline (rate: 3-5 mL/s). CT acquisition is timed to start 5 seconds after opacification of the common carotid artery of more than 150 Hounsfield units. Axial images reconstructed with a maximum of 2.0-mm increments. Thinner slices and multiplanar reformats may also be reconstructed. For delayed phase CTA [5,6], a repeat acquisition started 55-60 seconds after starting the first scan, using the same parameters as in first scan. The delayed phase acquisition is used to confirm persistence of lack of intracranial contrast over a longer duration. The standard 1- or 2-phase CTA is limited as it provides a static volume of brain vessels images performed during 1 or 2 specified time points (snapshot views). The predetermined time point used is often unreliable in these patients due to the abnormal or delayed flow.

Can Assoc Radiol J. 2017 May;68(2):224-228

4-point CTA score

Vessel	Lack of Opacification
Right cortical segment of middle cerebral artery	☐ Yes ☐ No
Left cortical segment of middle cerebral artery	☐ Yes ☐ No
Right internal cerebral vein	☐ Yes ☐ No
Left internal cerebral vein	☐ Yes ☐ No
AJNR Am J Neuroradiol 2009;30:1566e70. Can Assoc Radiol J. 2017 May;68(2):224-228.	

7-point CTA score

Vessel	Lack of Opacification
Right pericallosal segment of middle cerebral artery	☐ Yes ☐ No
Left pericallosal segment of middle cerebral artery	☐ Yes ☐ No
Right cortical segments of the middle cerebral artery	☐ Yes ☐ No
Left cortical segments of the middle cerebral artery	☐ Yes ☐ No
Right internal cerebral vein	☐ Yes ☐ No
Left internal cerebral vein	☐ Yes ☐ No
vein of Galen	☐ Yes ☐ No
Am J Neuroradiol 1998;19:641e7. Can Assoc Radiol J. 2017 May;68(2):224-228.	

***Note: Recommended time interval between first and second examinations in various age groups**

Adults: minimum of 30 minutes ** Infants (above 60 days – 1 year) 24 hours

Children (above one year) 12 hours ** neonate (7 days – 60 d)

APPENDIX 5: LIST OF COMMONLY USED DRUGS AND A FIVEFOLD HALF-LIFE THAT CAN BE CONSIDERED WHEN MAKING A DECISION ABOUT DEATH BY NEUROLOGICAL CRITERIA

	Drug	**Half life**	
Opioids	Fentanyl	3.3-4.1 hours	↑CPBS, Aged, Prem; ↔Child
	Oxycodone	2.1-3.1 hours	
Sedatives	Dexmedetomidine	2 hours	
	Diazepam	30-56 hours	↑Aged, LDL, ↔ Hth
	Lorazepam	9-19 hours	↑LD, Neo, RD; ↔ Aged, CPBS, AVH; ↓Burn
	Midazolam	1.3-2.5 hours	↑Aged, Obese, LD; ↔ Smoking
	Pentobarbital	15-50 hours	
	Phenobarbital	81-117 hours	↑LD, Aged; ↓Child; ↔ Epilepsy, Neo
	Thiopental	8-10 hours	
	Propofol	2.3-4.7 hours	A much longer terminal t1/2 was reported following prolonged IV infusion.
	Zolpidem	1.7-2.1 hours	↑Aged, LD; ↔RD; ↓Child
Other	Baclofen	2.8-4.7 hours	
	Bupropion	10-11 hours (7.9-18.4)	↑Aged, LD; ↔Alcohol

APPENDIX 6: UNIFIED CONSENT FORM

إقرار الموافقة على التبرع بأعضاء وأنسجة شخص متوفى

Consent to Donate a Deceased Person Organs and Tissues

EOTC File No. رقم الملف بالمركز	Medical Record No. رقم الملف الطبي	Time الوقت	Date التاريخ

Deceased person Information المعلومات الخاصة بالمتوفى

Name / الاسم	
ID/ Passport No/ رقم الهوية / جواز السفر	
D.O.B/ تاريخ الميلاد	
Nationality/ الجنسية	
اسم المنشأة الصحية التي حدثت فيها الوفاة The Name of the Healthcare Facility Where the Death Occurred	

معلومات الشخص الذي أبدى الموافقة على التبرع بأعضاء وأنسجة المتوفى المذكور أعلاه

The Person Authorized to Consent for Organs & Tissues Donation of the deceased mentioned above

Name:	:	صلة القرابة Kinship	
D.O.B:	الميلاد:	Father - الأب	☐
ID/ Passport No:	هوية/الجواز:	The Mother - الأم	☐
Valid to:	ة لغاية:	Children الأولاد	☐
Issuing Place:	ها:	Spouse - الزوج أو الزوجة	☐
E-mail:	الالكتروني:	Grandfather - الجد	☐
Telephone No. :	تلفون:	Siblings الأخوة و الأخوات	☐
Address:	ن:	العم العصبة. ويقدم العم الشقيق على العم لأب The Uncle by Consanguinity. Priority shall be given to the full brother uncle than the uncle of paternal.	☐
Nationality:	سية:	في حال الاختلاف بين الأقارب في ذات درجة الترتيب يعتد برأي الأكبر سنا ويتساوى الذكر والأنثى Whenever disagreement in the decision amongst the relatives of the same degree of kinship occurs, the decision of the eldest is considered, and both male and female are equal.	

☐ وفقًا لقانون دولة الإمارات العربية المتحدة (مرسوم بقانون اتحادي 25 لسنة 2023 في شأن التبرع وزراعة الاعضاء البشرية والانسجة)، أعلن أنا المذكور أعلاه وأنا بكامل قواي العقلية وبدون أي إكراه مادي او معنوي بأنني موافق على التبرع بأعضاء وأنسجة قريبي المتوفى المذكور أعلاه، وذلك لزراعتها لأي مريض مناسب حسب ما تراه الجهات المختصة في هذا المجال.

☐ **According to UAE (Federal Law No. (25) of 2023 concerning the Human Organ & Tissue Donation & Transplantation) , I aforementioned signed , with fully aware of and of my own free will (without any physical**

or moral coercion) granting consent to donate organs and tissues of my deceased relative mentioned above, in order to transplant them to any suitable patient (s) as deemed by the competent authorities in this field.

☐ **I authorize the burial of my deceased relative in UAE** ☐ **أصرح بدفن قريبي المتوفى المذكور أعلاه داخل الدولة**

☐ **I wish to repatriate the body of my deceased relative to Home Country** ☐ **أرغب في إعادة جثمان قريبي المتوفى إلى الوطن الأم**

Remarks:	**ملاحظات:**

Authorized Person Signature:		**توقيع الشخص المخول بالموافقة :**

The Witnesses-الشهود

Name الإسم	**Relationship صلة القرابة**	**Identification No. رقم الهوية**	**Signature التوقيع**

The authorized coordinator for the consent of donating organs and tissues: (Assigned by the National Organ Transplant Committee to approach deceased family for organ donation)	**Name:**		**الاسم:**	**المنسق الذي حصل على الموافقة بالتبرع بالأعضاء والأنسجة: (المعتمد من قبل اللجنة الوطنية لزراعة الأعضـــاء لمقابلة ممثلي عائلة المتوفي، للحصول على الموافقة بالتبرع بالأعضاء والأنسجة)**
	Signature:		**التوقيع:**	

*** Please attach copy of the authorized relative ID/ Passport who signed this Consent form** ***الرجاء ارفاق نسخة من هوية/ جواز سفر الشخص الموقع بالموافقة على هذا الإقرار**

P.O.BOX 1853 • دبي المتحدة العربية الإمارات .DUBAI, UNITED ARAB EMIRATES • فاكس FAX +971 4 2301929 • هاتف TEL +971 4 230 1000
ص.ب
www.moh.gov.ae

APPENDIX 7: UAE FORM FOR WITHDRAWAL OF ORGAN VIABILITY MAINTENANCE EQUIPMENT

UAE FORM FOR WITHDRAWAL OF ORGAN VIABILITY MAINTENANCE EQUIPMENT

Patient name:	**Hospital:**
Date of Birth:	**Gender:**
Nationality:	**Health Record No.:**
Diagnosis:	

This document is to confirm that the above-named patient is declared dead. Hence, the Organ sustaining therapy will be withdrawn, and medical therapies are no longer indicated and will be terminated since death has occurred.

Treating/ Most Responsible Physician
Name:
Signature and stamp:
Date and time:

APPENDIX 8: APNEA DURING ECMO TREATMENT

Clinicians should adhere to the following protocol for apnea testing on ECMO:

1. Preoxygenate by using 100% FiO2 on the ventilator and through the membrane lung.
2. To achieve an adequate increase in PaCO2 level, either titrate exogenous CO2 into the ECMO circuit or adjust the sweep gas flow rate to 0.2–1 L/min.
3. Sample ABG measurements from both the patient's distal arterial line and the ECMO circuit postoxygenator for patients on VA ECMO.

   Patients cannulated centrally, via the right carotid artery or via the right axillary artery, should have the distal arterial sample obtained from the left upper extremity or lower extremity.

   Patients cannulated through the femoral artery should have the distal arterial sample obtained from the right upper extremity.

   PaCO2 and pH levels from both locations are required to meet BD/DNC criteria for the apnea test to be consistent with BD/DNC. This ensures that independent of the mixing point, the PaCO2 and pH levels in the cerebral circulation meet BD/DNC criteria.

   For patients on venovenous ECMO, sample ABG measurements only from the patient's distal arterial line.
4. Avoid hypotension during apnea testing on ECMO by increasing ECMO flows, intravenous fluid administration, or vasopressor/ionotropic support.